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IN TH UNITED STATES PATENT AND TRADEMARK OFFICE

Application of John P. Tarlano Examiner: Thomas R. Artman

Serial No. 10/608,105 Group Art Unit:2882

Filed: June 30, 2003

For: Method For Inactivating Cancer Cells In A Human Body And Apparatus

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SUBMISSION OF A PRINTOUT OF AN INTERNET PUBLICATION

Honorable Commissioner Of Patents

P.O. Box 1450

Alexandria Virginia 22313-1450

Sir:

Please place the attached copy of a printout of an internet publication in the file of the present patent application

REMARKS

A sheet, holding a copy of a printout of an internet publication, is attached. The internet publication is hereby submitted for record purposes in the present patent application

The internet publication does not mention x-ray guns. The publication does not make obvious x-ray apparatus comprising four x-ray guns, each of the four x-ray guns generating a separate frequency of an x-ray burst. Thus the internet publication is not material to patentability of allowed claim 1.

The internet publication does not mention determining a subsequence of bases in DNA of cancer cells and irradiating selected bases of the subsequence of bases with a series of x-ray pulses having a sequence of frequencies. The internet publication does not make obvious use of four x-ray pulses, each x-ray pulse having a separate frequency, to irradiate a selected series of bases in DNA of cancer cells. Thus the internet publication is not material to patentability of allowed claim 2.

John P. Tarlano 8/19/2005

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Soft X-ray Emission and Absorption Spectra of Base Molecules, Deoxy-Ribose, and DNA in the C *K*, N *K*, and O *K* Regions

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Electronic structure analysis of biological molecules has been required to understand their physicochemical reactions in radiation chemistry/biology. For example, Akamatsu [1] recently reported the physicochemical changes of 2-deoxy-D-ribose molecules under the monochromatized x-ray irradiation. We therefore measured the soft x-ray emission and absorption spectra of essential biological molecules (base molecules, deoxy-ribose, and DNA), and compared these x-ray spectra with calculated spectra to analyze their electronic structures. Powder samples of adenine (denoted by A), guanine (G), cytosine (C), thymine (T), 2-deoxy-D-ribose (dR), and DNA were commercially obtained, and their soft x-ray emission and absorption spectra in C *K*, N *K*, and O *K* regions were measured in BL-8.0.1 and BL-6.3.2. Calculated spectra were obtained by discrete-variational (DV) -Xα molecular orbital calculation method. Figure 1 shows the x-ray emission spectra of the base molecules, deoxy-ribose, and DNA, and their calculated density of state (DOS) spectra of occupied C2p, N2p, and O2p orbitals. Spectral feature differences in the x-ray emission spectra were observed among the samples, and the calculated DOS spectra approximately agree with the x-ray spectral features. Further theoretical analysis of the x-ray emission and absorption spectra is in progress to determine the electronic structure of the biological molecules.

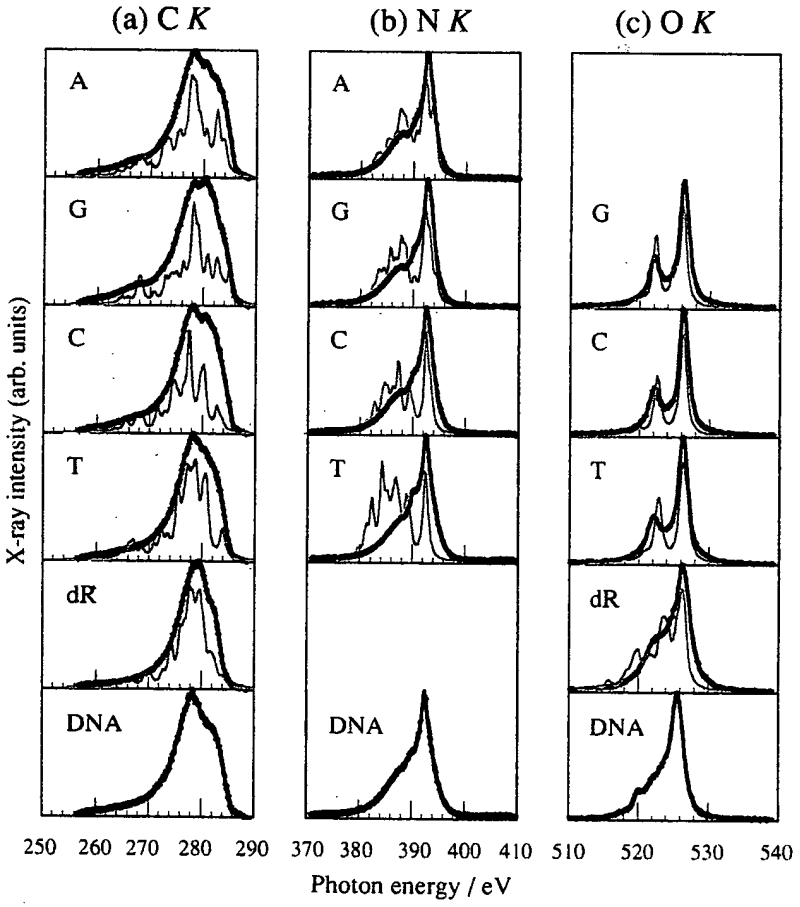

Figure 1. Soft x-ray emission spectra (bold lines) of base molecules (A, G, C, T), deoxy-ribose (dR), and DNA in the (a) C *K*, (b) N *K*, and (c) O *K* regions. Occupied C2p-, N2p-, and O2p-DOS spectra of base molecules and deoxy-ribose are superimposed on the corresponding x-ray emission spectra.

[1] K. Akamatsu et al., J. Synchrotron Radiation (in press).

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